REPORT OF THE POMOLOGIST. 1888

SIR: I have the honor to submit the following report for the year 1888:

The fruit crop of the United States for this year is the largest ever produced, there being scarcely a section of the country that has not been well supplied with the fruits usually grown there. The work of the Division of Pomology has continued to increase, and the interest manifested by the fruit-growers of the country is of a very encouraging nature. There are now on record in my office over eight thousand correspondents who have responded to the questions asked them. These and all others who have expressed a desire to receive the annual or special reports of this Division have been promptly supplied with them.

The volume of correspondence has increased to such a degree that it is only by the most vigorous exertion that the office force has been able to answer it. This is a pleasant although arduous duty, and I sincerely hope that our ability to respond may keep pace with the increasing demands.

FRUITS EXAMINED.

Within the last year the number of specimens sent for identification and study has greatly increased. Fully 10,000 specimens have been received and many of them quite rare and of special interest. In nearly all cases where the true names were desired by the party sending I have been able to give them. The experience of this office proves beyond question that there is, even in the oldest-settled parts of the country, a considerable degree of ignorance of the names of standard varieties of fruits. It is chiefly through such ignorance that local names are given to old varieties, thus multiplying synonyms and creating confusion in nomenclature and working harm to the practical grower and especially to the beginners. To remedy this evil so far as may be, is one of my constant efforts, and I am happy to say that progress is being made in that direction. To this end I wish to hereby call the attention of all who may share such a desire to the fact, that I have constantly on hand boxes made especially for transporting specimens of fruits by mail, and franks to use in returning them to this office, which will be sent to any desiring to avail themselves of the privilege. Printed directions for packing and sending will also be sent.

CABINET OF RECORDS.

There have been made and placed in the archives of this Division over three hundred drawings and water-color paintings of fruits, which, together with carefully-prepared written descriptions, are a

permanent record. This cabinet is not only of scientific interest to pomology, but also of practical value to the industry it represents. The services of a skillful artist are thus made available for preparing the necessary original copies for illustrating the reports of the Division, as may be seen herewith, as well as of assistance in comparative study and permanent record.

OFFICIAL VISITS.

In compliance with the orders of the Commissioner of Agriculture, during a part of the months of January and February I visited the State of California for the purpose of attending the meetings of the American Horticultural Society held there during that time, and to make such investigations of a pomological nature as I might see proper.

Two meetings of this society were held, one at San José, in the famous Santa Clara Valley, and the other at Riverside, in the southern part of the State, and where the orange is grown to its greatest perfection. Almost the entire State was traveled over during the visit, but at that time of year it was only possible to see the citrus fruits and olive in bearing.

To one who has never there seen the great stretches of vineyard and orchard it would be a surprise, even after reading various accounts of them.

The greater part of these plantations are on the level surfaces of vast plains and not upon slopes as I had supposed.

One very noticeable feature was the thorough cultivation. I think that on an average the weeds found on 10 acres of California orchard or vineyard could be carried under one arm, and the ground seemed to have been stirred in the most effectual manner. The soil is usually a loose sandy loam of a brownish color. Another thing that surprised the Eastern orchardists was the severe annual pruning practiced upon the peach, pear, plum, and cherry. The growth is remarkably strong on the Pacific coast, and all growers there agree that it is essential to cut back heavily every winter. This they claimed is for two reasons, viz, to prevent overbearing, and to keep the trees stocky for convenience in cultivating them and gathering the fruit. The climatic conditions are so peculiar there that I am not sure that the same method of pruning would be suitable east of the Rocky Mountains; but I think a lesson in thorough and perpetual cultivation is plainly taught. If the same attention was bestowed in this regard in the Eastern and Central States I have no doubt that much better fruit would be grown. It has been my opinion for years past that the true theory of orchard culture is to stir the entire surface of the soil frequently but not deeply (say 3 inches) during every year so long as the orchard lives. If this treatment is varied by seeding to clover for a year or two no evil may result, but in no case should small grain be sown.

During the fall an official visit was made to southwestern Missouri and northwestern Arkansas. This region seems peculiarly adapted to the growth of many of our leading fruits. The elevation above the sea-level is much greater than for hundreds of miles in any direction, making a cooler climate in summer than might be supposed for that latitude, and producing winter apples of good keeping qualities. The lay of the land is quite mountainous in places, but there is an abundance of undulating and level land upon which to plant

large orchards. The size, color, and flavor of the apples grown there are very superior. The peach seems to be at home also, and more luscious peaches I have never tasted than grew there. The peach crop rarely fails south of Springfield, Mo., west of the center of the State and east of Indian Territory. The pear also does well there, but blight is sometimes seen.

Small fruits of all kinds flourish in the rich soils. More thrifty fields of raspberry and blackberry I never saw than on the Olden Fruit Farm in Howell County, Mo. This is one of the most promising large fruit farms in the Central States. About 4,000 acres are in this tract, which is covered with oak timber, except about 1,000 acres, which have been cleared and planted principally to the peach and apple. This enterprise is already paying, although only four years have elapsed since the first clearing of the native growth and orchard planting began. Last year the gross receipts were over $9,000, and mostly from the sale of the first crop of peaches on the oldest trees. No disease and very few borers have to be contended with in peach culture there.

The grape grows and bears well, but so far it has not been considered as profitable as the orchard fruits.

To those desiring to move to a country of mild winters, and summers not too warm, and engage in fruit growing, I know of no better place in the Central States.

INVESTIGATIONS IN FOREIGN COUNTRIES.

Prof. J. B. Steere, of Ann Arbor, Mich., having determined to visit the Philippine Islands for scientific investigations, I arranged with him to secure for this Department such seeds and plants as he might think valuable for trial in the more tropical parts of this country. He forwarded seeds of several species of *Anona* and of the best varieties of the mango found there; but I am sorry to say that the latter were (as I had feared they would be) entirely dead upon arrival here. Plants of six varieties of the banana came through in good order. The above were at once sent to southern Florida for trial.

In connection with this it may be of interest to give a part of Professor Steere's letter to me, written while there:

> The natives seem to have made no attempts at improving the fruits that have fallen into their hands, and the Spanish, their masters, have made as little, so that any excellence in the fruits of the country, or, in fact, any other products, will depend on the natural character of the country or on that of the original introductions, if they are introduced kinds. Unfortunately the citrus fruits, of which you spoke more especially, are one of the least cultivated, and rather poor in quality. The oranges appear to have been introduced from China, and have gained nothing in transportation; a loose-skinned small one is cultivated about Ilo Ilo of good quality. Lemons are of poor quality but of large size. Limes are good, but the pomelo is not equal to that of China. On the other hand, the bananas are of many varieties and of most excellent quality. These islands would seem to be one of the original habitats of Musa. There are at least three wild species, I believe. One of these is the "abacao," which is now cultivated on the islands for the product, Manila hemp, and seems to have been in use from time immemorial by the people as a material for clothing, fishing nets, etc. It rarely fruits, and loves a cool, moist climate best; the finest specimens I saw were at a height of 2,500 feet, in the island of Negros, and with the thermometer marking 67° F. at night. The fruit is said to be full of seeds, like that of the other wild species. There is a second wild kind abundant in these central islands called "pacol" by the natives; its fiber is also used as a textile, and is finer but weaker than abacao; its fruits are greenish-yellow, angled or ribbed like the banana sold in the home (American) markets, and what pulp there is is sweet and

high flavored, but full of black seeds a little larger than apple seeds. The plant grows to a height of 12 to 15 feet, and is found in large numbers, sometimes occupying several acres to the exclusion of everything else. The fruit is eaten by birds and monkeys, and the natives also use it. At the south, in Mindanao, there is a third species with smaller and smooth yellow fruits, but also full of seeds. The cultivated varieties are very many, perhaps fifteen or twenty, and many of them are much finer than anything I ever saw in South America. I should think several of them would be very suitable for transportation and would be a fine addition to the fruits sold in our markets, but whether fitted for any part of the United States I do not know. I shall return in August or September, and might bring along plants of all the better varieties obtainable, if you thought it desirable.

The mangoes of the islands are of several (about three) varieties, and of excellent quality. Here in the central Philippines the trees are large and of great beauty, spreading, and the branches reaching the ground on overy side, forming great masses of dark green, which are landmarks, as they can be distinguished from all the other vegetation. The trees have an irregular way of shedding their leaves which is curious—shedding them on one side or one branch at a time, and the fruiting of the tree is determined by this.

Cocoa-nuts are here of great excellence and a great number of varieties, but of course would be of no use to you.

I found at Tamboanga Mindanao, a fruit—one of the custard-apples—of very excellent quality, resembling the cherimoya of Peru in shape, flavor, and seeds, but reddish in color; it is probably, I should think, a South American introduction; perhaps changed by the conditions found here. I have preserved seeds of it.

The guava of South America has been imported here and has run wild in great quantities in waste places, but has not been improved by the change.

The durion exists at Tamboanga, but did not fruit this year, so that I had no opportunity to test its quality.

The Spanish priests have introduced the grape, and one sees vines frequently about their houses, but it leads a sorry existence, and I have not yet seen it fruiting.

The nanca or jack-fruit, I believe, grows abundantly and of enormous size, but as elsewhere is coarse and unfitted for our taste.

Water-melons and musk-melons are practically unknown.

I shall be coming back at a time that will allow of bringing living plants with me, and if there is anything needed in your Division of the Department, or any other, which I can obtain, I shall be glad to undertake to bring it.

A number of fruit seeds have also been received and distributed from Japan, the East Indies, and South America.

Plants of fifty varieties of the best English gooseberries were imported and distributed in Oregon and Washington Territory. They are reported as growing thriftily, and it is expected that they will succeed there quite as well as in England.

OUR WILD FRUITS.

The wild fruits of the United States are certainly of such great value that every possible means should be employed to thoroughly investigate them in their natural localities, and introduce to cultivation such as are likely to prove of value to the practical pomologist, or the scientific experimenter. Many of the most valuable fruits now cultivated in America are entirely of native origin. There are very few varieties of the grape planted and successfully grown in the vineyards east of California and New Mexico that are not direct descendants of the wild species of our forests and thickets. And yet the natural field as regards this fruit alone has been as yet but poorly explored.

The Concord is but one remove from the wild *Vitis labrusca* as found in the woods of Massachusetts. The people of the United States will never fully appreciate the value of the labors of Mr. Bull in originating this variety; for they not only resulted in placing this delicious grape on the tables of the rich and poor alike, at a small price, but the Catawba, the Delaware, and all other grapes pre-

viously grown and sold for more than the poor could pay, were thereby lowered in price, and a stimulus created in grape culture which will never cease to be a blessing to our people. Norton's Virginia is a wild seedling of *V. æstivalis* that stands to-day as one of the nearest proof against the dreadful fungus diseases, and unsurpassed as a wine grape by either foreign or native varieties. The Clinton, which is a pure seedling of the wild *V. riparia* (a species that has the widest natural range of territory of any of the genus), has proven so well able to resist the attacks of the dreaded phylloxera upon the root, that French vineyardists have bought millions of the plants and cuttings upon which to graft their more delicate varieties.

As yet the wild grapes of America have but barely begun to be utilized. In my last annual report I said that the investigation of this subject by this Division had been taken up, and I have now to report that the results of the work of the year 1888 have been of the most interesting character. A monograph of the genus *Vitis* is being prepared for publication by the Division with the assistance of Mr. T. V. Munson, of Texas, as a special agent, and a considerable part of the work is already done. As the field-work, the preparation of the original colored illustrations, and the literary part also progressed, it became evident that we would need all of another year to complete it. The number of species known to be native in America has increased from twenty-two to twenty-six within the last year as a result of our field-work, and present indications are that more may yet be found. Some varieties lately discovered have such good qualities that they will be of special value to our vineyardists even without the improvement that cultivation will immediately bring about; as the basis of varieties that may and will be produced by hybridization they are certain to be of the highest value.

The patience of many correspondents is bespoken with this work; for the value of accuracy and completeness, as near as may be reached, is too great to be jeopardized by hurry and premature publication.

But the grape is by no means the only wild fruit that deserves attention, or that is receiving it. The wild plums are fast becoming a popular orchard fruit, not that they are as good in quality of fruit as the European varieties, but their comparative ability to resist insect attacks gives them a great advantage. If it were not for our native species, our markets and our tables would rarely be supplied with plums, except in a few favored localities. As it is, there need not be a farmer or owner of a village lot who may not have an abundance of this fruit by taking quite ordinary pains to produce it. The varieties differ sufficiently in time of ripening to cover a period of fully two months.

There are but few of the small fruits commonly grown in the United States that are not the product of her native flora, improved by the skill of her citizens, or wildlings selected directly from the hand of nature.

It is my purpose to expend all the time and money that can be justly devoted to such work in field investigations with a view to determining the territory occupied by each species, their botanical relationships and variations, and to discover and preserve for culture and scientific experiment such as may be likely to prove worthy. There is no doubt that every year many chance seedlings of wild

origin disappear before the ax and fire of the settler. Such cases have been reported to this office, and others have been frequently brought to public notice.

PARIS EXPOSITION.

This Department having, by act of Congress, been directed to prepare an exhibit for the Paris Exposition during 1889, it became my duty to attend to that part of it relative to the fruit industry. This work is but partially begun, but it is expected to secure an exhibit of dried, canned, and preserved fruits that shall be a credit to the country.

THE APPLE.

The year 1888 will be remembered as a remarkable one for an abundant apple crop in all the States where that fruit is grown. In some places good winter apples would only bring the grower about 10 cents per bushel, and many thousands of bushels were allowed to rot in the orchard because of no market demand. In Ohio and some of the neighboring States where last year there was almost no crop, this year there has been an abundant one and of excellent quality. In Wisconsin, Minnesota, Dakota, northern New England, and parts of Iowa and Nebraska where the apple is grown with difficulty, there has not been so much failure reported this year as usual. During the past year there have been received at this office about fifty varieties of Russian apples, principally from Iowa. Their season of ripening began about August 1, and with very few exceptions ended with September. Their perishable character was very noticeable upon the table here beside the ordinary summer apples of the country, and the opportunity for testing them together was very good. Their flavor, I am sorry to say, with one or two exceptions, was very poor, and insipid or sour and astringent. In appearance they were generally quite handsome, and some were exceedingly so, but not in this regard superior to our old varieties. In size they averaged rather small. I give in this report accurate descriptions of four varieties which are rather above the average in quality, and only wish that I could say better things for them. The blight has also been very severe on the Russian apple trees this year, which seems to be the most serious defect, next to their scarcity of late-keeping varieties. It may be that some kinds now being tested may prove to be winter apples in the United States. It is, however, not to be inferred that those which are late keepers in Russia will be the same in season here, for experience with many varieties from there has proved this to be true.

The varieties described in this report are such as fairly represent this class of apples.

VARIETIES.

Jefferies.

If I should be asked to select the choicest early autumn apple known to me, I would say the Jefferies. It is a chance seedling that originated in Chester County, Pa., and was first brought to public notice by the Pennsylvania Horticultural Society about the year 1853. It has been propagated and planted to a slight extent all over the country, and in all cases heard of it has been highly praised.

The tree is of upright growth, forming a beautiful head. The twigs are slender and of a reddish color. The leaves are rather narrow and bright green.

It begins to bear early, and is one of the most constant and abundant bearers of which I have any knowledge. No family orchard should be without it, and for market I have good authority for highly recommending it.

The illustration on Plate No. 1 was made from a specimen grown by Rev. S. M. Irwin, of Geneva, Kans.

Size, medium; shape, flat, slightly conical, regular; surface, smooth, yellow, profusely covered with carmine stripes and crimson splashes; dots, large, light, scattering; basin, medium, regular; eye, closed; cavity, rather deep, sloping, slightly russeted; stem, short; core, medium, meeting the eye; seeds, numerous, plump; flavor, sub-acid, rich, aromatic; quality, best; season, August and September in the Middle States.

Borovinka (No. 245).

This is one of the varieties imported from Russia in 1860 by the U. S. Department of Agriculture and distributed under the number "245." The specimen from which the accompanying Plate No. 9 (Fig. 1), was made, was grown this year by C. G. Patten, Charles City, Iowa.

Size, medium, diameters 2 by $2\frac{15}{16}$, axial $1\frac{3}{8}$; shape, flattened oval, regular, unequal; base, wavy; surface, uneven, greenish-white, mottled, splashed and striped with red; dots, minute, white; basin, shallow, dished, little crimped; calyx, closed, segments broad and long, eye deep; cavity, abrupt, deep, and regular; stem, very long, slender; core, large, broad, flat, closed; seeds, round, flat, dark-brown; flesh, yellow, tender, grainy, dry; flavor, mild, sub-acid, pleasant, not much character; quality, poor; season, September in Iowa.

Prolific Sweeting (No. 351).

Of all the Russian apples that I have tasted so far this is the best in quality. It was grown by Dr. T. H. Hoskins, Newport, Vt. (See Plate No. 9, Fig. 2.)

Size, medium, $2\frac{3}{8}$ by $3\frac{1}{4}$, axial $1\frac{1}{2}$; shape, irregular, flattened conical, base and apex very irregular; surface, smooth, yellowish-white, tinged with green; dots, many, minute, indistinct, white, also a few are distinct and of a russet color; basin, broad, shallow, irregular, and very much folded; calyx, small, closed; eye, closed; cavity, irregular, deep, a little light russet; stem, medium thick, curved, light-green; core, medium, closed, clasping, "watery;" seeds, numerous, broad, flat, light-brown; flesh, white, fine grained, firm, juicy, clear water-spots; flavor, sweet, very pleasant; quality, good; season, September in Vermont.

Zolotoreff (No. 275).

Grown by C. G. Patten, Charles City, Iowa. (See Plate No. 10, Fig. 1.)

Size, $2\frac{1}{4}$ by $2\frac{3}{4}$, axial $1\frac{3}{4}$; shape, irregular, flattened; surface, smooth, color white, slightly blushed and faintly striped on one side; dots, minute, white; basin, shallow, irregular; calyx, large, open, segments short and broad, far apart; eye, broad and open; cavity, shal-

low, irregular, russet; stem, short, thick, fleshy, lipped, inclined; core, large, clasping; seeds, large, brown; flesh, white, coarse and grainy, dry; flavor, acid, unpleasant; quality, very poor; season, September in Iowa.

Red Transparent (No. 333).

Grown by C. G. Patten, Charles City, Iowa. (See Plate No. 10, Fig. 2.)

Size, medium, 2⅛ by 2⅝, axial, 1⅞; shape, flat, irregular, angular, unequal; surface, smooth, green, lightly mottled and striped with red, thin, white bloom; basin, shallow, narrow, irregular; calyx, closed; eye, round, short; cavity, nearly none, dark green about stem; stem, very short, woolly; core, large, open; seeds, few, very broad, almost round, flat; flesh, greenish-white, tough, juicy; flavor, sour, acrid, astringent, disagreeable; quality, poor; season, September in Iowa.

THE PEAR.

There are several new varieties of this fruit coming to notice each year, and I have selected two of the best for illustration and special description.

Wilder.

Among the midsummer pears there is none that pleases me better than this one, except that its size is rather small. But like the Seckel, what it lacks in size it makes up in quality, although it is larger than that variety. It is a chance seedling found in Chautauqua County, N. Y. The original tree was partially grafted with scions of Buffum in 1870, when it was young, and would never have borne any fruit except of this old variety had not three of the natural branches been left. These bear profusely, and the fruit when fully colored is quite attractive. It doos not rot at the core.

Size, small to medium; shape, pyraform, bell-shaped, irregular, a little angular; surface, smooth, pale-yellow ground with deep shading of brownish-carmine; dots, very numerous and small; basin, shallow, regular; eye, nearly closed, sepals long and reflexed; apex, rather abrupt with a slight cavity; stem, short; core, closed, very small; seeds, very small, narrow, pointed, dark; flesh, very pale, whitish-yellow, fine grained, tender; flavor, subacid, sprightly, much like Bartlett; quality, very good; season, August, in western New York.

The colored drawing on Plate No. 3 was made August 10, 1888, from a specimen sent by Charles A. Green, of Rochester, N. Y.

Idaho.

This pear has been attracting so much attention and is of such real value that I take pleasure in giving it a place in this report. It is a variety raised from seed saved from an unknown variety and planted about the year 1867 by Mrs. Mulkey, of Lewiston, Idaho, and first brought to public notice in the fall of 1886 by Mr. John H. Evans, of that place. It has been stated in some of the papers that it is of Chinese parentage, "similar to Keiffer," but my opinion is that this

is a mistake, for the fruit bears no resemblance to that class either in flavor or texture. It is much like Angouleme in both these characters.

Specimens received at this office October 4, 1888, from Mr. Evans were in fine condition, and the illustration on Plate No. 2 of this report is as near exact in color, size, and shape as could be made, and is not exaggerated in any respect. The original tree began to bear fruit four years from the seed. I would recommend it for extensive trial, as the tree has already proven itself to be hardy in several northern States.

Size of fruit from 4 to 4½ inches diameter; shape, a little flattened, tapering slightly both ways from the center, quite irregular, depressed at the stem; surface, rough and uneven, yellow or straw color, with a faint blush or brownish-red on the sunny side, and a few bronzed blotches; dots, minute, dark, and very numerous; basin, deep, flaring, very irregular or ribbed, and thickly covered with fine brown dots; cavity, medium, abrupt, irregular; stem, stout and rather long; core, very small; seeds, few; flesh, almost white, fine grained, buttery, melting, lacks the grit so often found in pears; flavor, sweet, to mild subacid, rich and aromatic, juicy; quality, very good; season, September in Idaho.

THE PLUM.

Plum culture seems to be getting more popular as the improved varieties of the native American species become known, and also the benefit of spraying with arsenical mixtures to prevent the depredations of the curculio.

Wayland.

Among the host of native American plums that have been brought to notice this is the best one I have yet tasted.

Concerning the history of this plum Mr. T. V. Munson has given the following:

Downer & Brother, of Fairview, Ky., wrote me, November 3, 1888, in answer to my question for its origin, etc., the following:

"As to origin of Wayland Plum, it was sent us (J. S. Downer & Sons), during father's life, by Prof. H. B. Wayland, of Cadiz, Ky. We understood it to be a seedling on his premises, as he said it was in a plum thicket. We named this one Wayland. We introduced it but have lost sight of Professor Wayland; do not know that he yet lives."

It is of the same type or species as the Golden Beauty (discovered during the civil war, in western Texas, on the Colorado River), disseminated by G. Onderdonk, and the Kanawha plum, disseminated years ago by P. J. Berckmans. The origin of the latter I do not know. I suspect the Wayland is a seedling of the Kanawha.

Last August, when on a tour of investigation of native grapes and other wild fruits, I found a thicket of plum trees of the same character as the Wayland, being full of late fruit similar to that variety. I consider these all of the same species—*Prunus umbellata*, with whose botanical description they pretty well agree. They are certainly not of the Chicasa species, as commonly supposed.

The curculio may deposit eggs in the young fruit, but no signs of them can be discovered in the mature fruit. Neither are they affected with rot in this region, as are the varieties of *Prunus domestica*, or European Plum, and the Wild Goose, sometimes.

They ripen here in the last of August and first of September, about with the Heath Cling peach.

The stone is small, smooth, and ellipsoidal. The fruit makes fine jelly, jam, and preserves, and also cans well. No black knot or other disease yet noticed on any of this class.

In size it is fully as large as Wild Goose, nearly round in shape, and of a brilliant reddish purple. The season is quite late, in fact the latest of any good native American plum that I have seen. The quality is very good, and when cooked it is not sour as is the case with nearly all native varieties. In productiveness it is not excelled, a statement that I have the best of evidence to confirm. The illustration on Plate No. 5 was made from specimens sent me and grown by T. V. Munson, of Denison, Tex.

Clyman.

The subject of this sketch is not only a novelty but a noteworthy departure from the usual type of the varieties of the garden plum of Europe—*Prunus domestica.* It grew from a seed planted in 1866 by Mrs. Clyman in the Napa Valley, in California, and is supposed to have been taken from the old "Peach" plum. It first attracted attention by maturing its fruit long before any other plum of this family, being about with Wild Goose. The original tree having outgrown its surroundings three sprouts were dug from the roots, which are now ten years old, and have borne fruit continuously for the last six or seven years. The tree is a very vigorous grower and the leaves are extremely large, as samples of young shoots received from California this year testify. On the bearing branches they are much smaller, as the accompanying plate, No. 4, shows.

The first ripe fruit was picked this year at Napa City, Cal., on June 15, which is fully four to six weeks in advance of ordinary plums. Of course it may be expected to be subject to the attacks of the curculio, and should only be grown where a reasonable degree of immunity exists, or by those who expect to use defensive means against this dread enemy.

The fruit is round in shape, slightly flattened at the end opposite the stem, with a distinct suture on one side. The skin is a dark purple, with a heavy bloom over all, which gives it a rich bluish color. The flesh is yellow, firm, and of delicious flavor. When ripe it is a perfect freestone. The principal merit over the old varieties lies in its earliness, which makes it profitable for market purposes long before all other plums of this class.

I am indebted to Mr. Leonard Coates, of Napa City, Cal., for the specimens and the information here given.

THE PEACH.

The peach crop this year was unusually good over a great part of the United States, and generally of superior quality.

The peninsula which comprises Delaware and a part of Maryland is, perhaps, the mecca of the peach-grower, but that dread disease, "the yellows," is making sad inroads upon the industry there. But as the subject is now being thoroughly investigated by the best scientific experts to determine the cause, and, if possible, a remedy, it is hoped to be able to check, if not to overcome it.

The peaches of California are attracting much attention in the markets of Chicago and other of the more northern and central cities, where they are received in the fresh state, and the dried and preserved product from that State is also becoming very popular.

Parts of Arizona and New Mexico are well suited to peach culture, and will in time come more prominently before public notice in this

regard. The extreme southern parts of the Union are forced to cultivate a quite different class of varieties from those grown in what is known as the peach-growing sections. This matter is set forth very plainly in my annual report of last year (1887).

The facts seem to be that there is not enough cool weather in the greater part of Florida to afford sufficient cessation of growth in the ordinary kinds of peaches, and they either bloom at a time when they are killed by frost or do not bloom at all. In short, this strain of the peach family is out of climate there.

But when the Peen-to was introduced from China, an impetus was given to peach-growing in Florida. This variety soon bore fruit, and although small and of a peculiarly bitterish flavor, it was far better than none. The peculiar flattened shape made it a novelty, but its extreme earliness was the peculiar point of value, as it enabled the grower to place ripe peaches on the markets of the North during the early part of May.

Seedlings of the Peen-to were soon produced, which in some cases retained the flattened shape, and some were like ordinary peaches.

Bidwell's Early.

Mr. I. A. Bidwell (now deceased) began the planting of seeds of Peen-to in the winter of 1882. Two of the first nine seedlings that he grew were exactly alike in all respects, and produced fruit so different from and so much better than the parent that it was named in his honor.

In size it is from 1 to 2 inches in diameter, of an oblong shape, and pointed a little to one side of the center. The color is a creamy white with delicate blush on the sunny side. The stone is rather small and tapering, often split at the base and to which the flesh adheres slightly. Samples were sent me for two years past by Mr. James Mott, of Orlando, Fla., and the picture on Plate No. 6 was made from one of them.

There are many other new seedlings of this character lately originated in Florida, and some of them may in time prove to be more valuable than this one.

The Dwarf Juneberry (Amelanchier oblongifolia).

Nearly every person familiar with the trees and plants of his own State has gathered and eaten the Juneberry, or as some call it, "Serviceberry." The common species is a small tree, and there are few country boys in the Central States who have not climbed the trees in the early summer for their toothsome berries. There is, however, another branch of this botanical genus, which some claim is a distinct species, and others that it only a sub-species, that is of dwarfish growth, being about 4 feet in height, and in manner of growth much like the wild hazel. It is found wild in some parts of the Alleghany Mountains and in the Lake Superior regions and westward. It seems to me that there are specific characters sufficient to make at least two species of *Amelanchier*, if not several, among these dwarf forms.

At least one of them (*A. oblongifolia*) thrives well under cultivation and is becoming quite popular as a small fruit, especially in the prairie States west of the Mississippi River, although not native in that region so far as I know. There are several varieties which differ

slightly in height of bush and color and shape of foliage. The fruit also varies a little in color but is generally a dark purple when fully ripe. One variety in Missouri is said to be white. The fruit is a berry-like pome, nearly the shape and size of the common huckleberry. The flavor is sweet, or mild subacid, and by some thought to be too sweet for cooking purposes. It is very nice when made into sauce or pies mixed with green gooseberries, as the sharp acid of one and the sugar of the other seem to make a very good combination. I do not think it will ever rank equal with some of our leading small fruits; but it is certainly well worth a place in a family berry patch.

The plants propagate from suckers that spring up near the base of the bushes, but do not become a nuisance. They should be set about 2 or 3 feet apart in rows 8 feet apart and where they will never need moving, for once planted they will continue for one's life-time. There are no thorns, and insects do not seem to prey upon either plant or foliage or fruit. They transplant easily and are remarkably hardy from the Great Lakes to the Gulf. I have known plantations in Kansas, Nebraska, and Illinois for the last fifteen years, and they have never been killed by the heat of summer or the cold of winter, and one large patch on my own farm has never failed to bear abundantly in all that time.

Success.

This is a variety of the Juneberry that I prize more than any that I have ever tasted, and a colored illustration of it may be seen on Plate No. 7 in this report. It is now being sold by some of the leading nurseries af reasonable prices.

The Pepino (Solanum Guatamalense).

This plant is also called the "Melon Shrub," and has been quite thoroughly tested in the United States and found to succeed only in a very few places in Florida and California. It came originally from Peru and Guatemala. It was first brought to California by a Mr. Grelech, of Los Angeles. It has been so well described by him that I give an extract from what he says regarding it:

The Melon Shrub, as it grows in the Central American highlands, is, as the name defines it, a shrub. It reaches at its best 2 or 3 feet each way, but is generally smaller, and recalls in many respects the Chili pepper vine, the tomato, or the nightshade. The flowers resemble those of the Chili pepper, are very numerous and of a beautiful violet color, and are most charming when used in floral decorations. The plants should be set in rows 4 feet apart and 2 feet in the rows. A month and a half after being set out the fruit will begin to set, and in three months after planting the fruit will ripen and continue to ripen until checked by frost. The fruit is of the size of a hen or goose egg, or even larger, and very much of the same shape. The color is lemon or pale orange with streaks or waves of bright violet, the whole making a fruit unrivaled in beauty. The interior of the fruit is a solid pulp similar to that of a pear, also of a pale-yellow color, and of a taste resembling that of a fine musk-melon, but which has besides a most charming acid, so wholesome and so delicious that when the fruit is partaken of on a very warm day it allays the thirst for several hours. The plant is an enormous yielder. I have seen plants of small size, say 2 by 2 feet, bear 30 large fruits, which from their size and weight pressed the branches to the ground, and thus formed a most beautiful border all around the plant.

The Melon Shrub can stand light frost, but heavy frost will cut it to the ground. The dead branches should then be cut off, the plants covered with an inch or so of straw, and it will, if so protected, start up in the spring as vigorously as before.

Having decided upon the merits of this plant, and being satisfied that it will be-

come a most welcome addition to the fruit not only of California but of all the Middle and Southern States of the Union, we decided to bring the same with us to California and try it here. After a good deal of trouble, and I must say no little expense and anxiety, we have now eminently succeeded. Our experience has been, we think, most valuable to us. The Melon Shrub grows in California even better than in Central America, and the fruit is decidedly superior.

The following paper on "Our Cultivated Fruits, Native and Introduced" was prepared for publication by your direction, and although it covers a part of the same subject treated more fully in a special report on "Tropical and Semi-tropical Fruits," issued by this Division last year, yet I trust it will serve a good purpose to have it appear in this report.

Thanking you for the very deep interest you have constantly shown in the work of this Division, I am, sir,

Most respectfully,

H. E. VAN DEMAN,
Pomologist.

Hon. NORMAN J. COLMAN,
Commissioner of Agriculture.

OUR CULTIVATED FRUITS—NATIVE AND INTRODUCED.

[A paper prepared by W. H. Ragan, of Greencastle, Ind., under the supervision of the Pomologist.]

Horticulture is truly "an art which does mend nature." Were it possible for us to return even to medieval times and compare the conditions of pomology in those days with the present, we would certainly recognize the wonderful influence which man has wrought upon the fruits of the garden and the orchard.

The edible fruits of those early days were few in numbers and but slightly removed from the original types of the species to which they may have belonged. The liberal Hand which has so bounteously blessed us with the luscious fruits of our gardens, wisely designed that we should earn, to some extent, through acquired skill and knowledge gained by experience and observation, an influence over the fruits, which should enable us to so modify and change their natures as to better please and satisfy us. What we may assume to be an improvement upon nature may, however, only be a delusion, for in reality the perfect type of the species is that which is nearest to the hand of the Maker. Hence, the tree with its knarled body and thorny branches, and its load of austere, seedy crabs, was placed before us as a perfect type of the apple. In this were combined perfect health and vigor of tree with all the qualities necessary to the fighting of its own battles, and with procreative powers sufficient to insure the perpetuation of its species and the reproduction of offspring, without limit, which should, in turn, possess the same qualities of perfection.

This was the original apple, each generation of which, in a state of nature, was an exact counterpart of the generation preceding it—the same wild, thorny tree and the same seedy, acid fruit. But man did not highly value some of these qualities of perfection in the original species. He cared not for the numerous seeds, nor for the knots and thorns with which the tree was protected, as by an armor. It was the pulpy, edible envelope that surrounded the seeds that he prized, not caring whether this, to him, desirable portion covered, protected from harm, and nurtured the germs of future generations or not, so his wants were supplied.

It has already been said that man was given certain influence over these wild products of nature, which he could only discover by the slow process of practical experience and observation. As man was given "dominion over the beasts of the fields," so he also was endowed with powers to subdue the wild habits of the fruits of the forests and groves about him. The rational and intelligent way of accomplishing these results was, first, by removing the tree or plant from its wild surroundings, where it must struggle for existence, and placing it under his protecting care, where it might be supplied with all needed elements of plant food; and, second, by judicious and careful selection of seeds and germs, for the propagation of other and improved generations of offspring.

By these processes the rough, wild, self-reliant and self-perpetuating nature is gradually and surely overcome, and what was once an untamed species becomes

domesticated—trained to sport into varieties and forms widely differing from the original. Thus, generations of unconscious experimenters have gone before us in this interesting and profitable work, the results being manifested so slowly as to overtax the patience of any but a hopeful horticulturist, each age of experimenters leaving, perhaps, but little beyond a visible evidence of progress.

This process of domesticating and subduing our natural fruits progressed, until man, from being a mere experimenter, becomes a scientist; from the results being simply accidental, they become almost definite, under the controlling influence of the art of horticulture.

HORTICULTURE AN ART.

We have said that horticulture was an art. Its triumphs consist in molding, to a certain extent, nature's plants and their products to suit our fancies and our tastes. Botany is a science which finds in the plants of nature the perfect types of a species. A fruit, botanically speaking, is the natural ovule; the portion of the plant capable under favorable circumstances and conditions of reproducing its species. A fruit, pomologically considered, is the pulpy edible envelope or receptacle on which, or in which, the ovules are supported and matured. The fruit botanical is not the fruit sought to be improved and developed through the arts of horticulture, but the fruit pomological. Seeds and germs are of secondary importance to the horticulturist, since they are valueless only as they serve his purposes in the reproduction of new varieties, his art and acquired skill enabling him, when once a desirable variety is produced, to perpetuate it without again resorting to seeds. Thus we find our cultivated fruits, especially those most highly developed and therefore most highly prized, to possess fewer and smaller seeds in proportion to bulk and other desirable qualities than the original species in a state of nature. Indeed, these improvements have been carried so far in case of the cultivated banana and some varieties of grapes, pears, oranges, and other fruits as to have almost entirely eliminated the seeds, leaving only the desirable edible portion.

It is also possible to cultivate, with a given object in view, until varieties are so thoroughly established, as in case of the Heath peach, that they will reproduce themselves from seed, or varieties so closely resembling the parent as to be readily recognized by family features and characteristics. The discovery and recognition of these results have directed and encouraged the intelligent pomologist further and further in the line of investigation and experiment until, as above noted, he has become in reality a scientist in the triumphs of the arts of horticulture.

Notwithstanding the advanced conditions of fruit breeding, scientifically considered, and the great success which attends cross-fertilization and hybridization as a means of securing new and desirable qualities, a large per cent. of our cultivated varieties, and many of them possessing the highest merit, are, and will continue to be, accidental seedlings. as will also a large proportion of seedlings grown from artificially fertilized seed prove to be worthless.

The effect upon tree or plant resulting from this process of "mending nature," which the horticulturist has been engaging in, while securing desirable improvements in their fruits, has already been hinted at. In a state of nature there existed a perfect equilibrium of forces. Then, again, each species was planted by nature in soil and climate congenial to it. Man has interfered with both; he has disturbed the one by selections and by cultivation with a given object in view, while he has sought to adapt a species, limited by nature to a small area of territory, to vast districts with greatly varying climatic conditions. Thus he has first weakened vitality by the neglect of natural qualities, and, second, he has transplanted the species into uncongenial soils and climates.

Why should we wonder, then, that our cultivated fruits are so delicate in constitution and so sensitive to the varying conditions of our fickle climate? Why should we wonder that the peach, a native of hot and arid Persia, should refuse to yield its luscious treasures on the bleak and frozen plains of the Northwest?

To treat our subject in detail and to avoid a mere compilation of descriptions of varieties of new fruits, often highly colored by self interest, the republication of which would not unfrequently prove of greatest value to introducers, would require greater practical knowledge of pomology in all its various branches and in the widely varing soils and climates of the United States than the writer presumes to possess. Hence the descriptive-catalogue plan of treatment is abandoned in favor of the more general one following:

THE APPLE (*Pyrus malus*).

Of introduced fruits the apple stands at the head. The process of improvement of this fruit, as indeed of most introduced species of fruits, has been in progress

from an early period of history, and is therefore very far removed from the original type of the species. The multiplication of desirable varieties has, however, been greatly accelerated within the period covered by American history, and largely upon American soil.

Stephen Switzer, in the *Practical Fruit Gardener*, published in London, in 1723, describes but twenty-one varieties of apples as then known to pomologists, which he, as the leading pomologist of his day, considered worthy of a place in his book. William Coxe, the first American author, in 1817, describes and illustrates by cuts one hundred and twenty-three varieties, partly of American origin, but largely from Europe, while Charles Downing, in his latest revision of his brother's work, Fruit and Fruit Trees of America, published in 1885, describes about two thousand varieties of this noble fruit. This large list of varieties, each of which possesses merit justifying this noted author in giving it a place in his cyclopedia of American pomology, is now rapidly being augmented by new and promising sorts introduced from Europe and by accidental as well as by artificial propagation, cross-breeding, and hybridization.

A great stimulus to the work of propagating and introducing new sorts of apples has its basis in the rapid decay of old and established varieties, from climatic changes, diseases, and insects, incident to the settlement of our country and its gradual conversion from a wilderness to a densely populous region. These causes have induced our enterprising pomologists to search the remotest countries of the civilized world and to encourage and foster every hope, having its origin in new varieties, to gratify a desire to re-establish this standard fruit in regions heretofore producing crops of apples, and even to adapt its culture in naturally uncongenial climates and soils.

With this commendable object in view, the great Northwest is now being filled with varieties from the steppes of Russia and their hardy iron-clad offspring, while the south of Europe and Asia are being diligently searched for such as may succeed in the warmer portions of our country. How far these efforts to reclaim and re-establish the apple industry in our land may prove entirely successful and satisfactory is at present a question only partially solved, but that progress is being made is apparent to all close observers. There is no section of the country where more persistent, and in reality where more encouraging effort is now being put forth, through the zeal and enthusiasm of local pomologists, in successfully adapting the apple through introductions from abroad and careful scientific breeding afterwards, with a view to overcoming almost insurmountable climatic conditions, than in the great Northwest. All honor and success to the public-spirited, liberal-minded, intelligent horticulturists, who are thus engaged in a work that must prove a blessing to unborn generations.

Our cultivated apples and nearly all crabs are of foreign descent, the former from the wild apple (*Pyrus malus*) and the latter from the wild crab (*P. bacata*) each of northern Europe. Improved varieties of the crab are now quite numerous, many of which are highly esteemed in the North on account of extreme hardihood of tree and fruit. It is thought by some that the Wealthy apple, of Minnesota origin, and justly popular in that severely cold climate, is an accidental cross between these two species.

The Pear (*Pyrus communis*).

Standing next to the apple and closely related botanically may be ranked the pear, which is also of foreign descent. It is less generally cultivated than the apple. Although Switzer describes more varieties in 1723 than he does of the apple, Downing's work does not include more than half so many. This is doubtless partially due to the fact that the pear succeeds better in Central Europe than in America. Until within recent years our catalogue of pears was largely made up of varieties of foreign origin, notably from France and the Netherlands.

During the early years of the present century a great impetus was given to pear culture, through the origin and dissemination of new and promising varieties, by Dr. Knight, of England, and Professor Van Mons, of Belgium. The methods adopted by these justly noted scientific breeders of new and improved varieties were radically different, the first consisting in cross-fertilization and hybridization, while the latter pursued the less scientific, though, in his case, quite successful, method of breeding by selections; that is, by selecting the seeds of varieties as nearly the original type as possible, but already in a state of variation, and hurrying them through generation after generation until satisfactory results were obtained. Many fine varieties, not only of pears, but also of other classes of fruits, were the direct results of the labors of these eminent gentlemen.

During the latter half of the present century many new and desirable varieties have had their origin in this country. Indeed, American varieties now largely predomi-

nate in our leading catalogues. Recent introductions of pears (like the apple and other classes of fruits) have been and are being made from Northern Europe, China, and Japan, with special objects in view; that of hardihood and freedom from disease in the North and West, and of adaptability in the more southerly portions of our country. Perhaps the best of these introductions in the South are the hybrids and cross-breeds of the Asiatic species, originating here, for which are claimed a combination of qualities, rendering them of great value south of the fortieth degree of latitude, especially for market purposes. The Keiffer and Le Conte are the most promising of these. They are acknowledged to be true hybrids between the Chinese Sand pear and varieties of the species *Pyrus communis*, combining some of the good qualities of each. The late introduction from the north of Europe and their descendants are thought by some to be especially valuable and promising above the fortieth parallel of latitude.

THE PEACH (*Persica vulgaris*).

Though a native of Persia and the south of Asia, the peach has become so fully acclimated in many sections of our country as to be justly entitled to a front rank in point of commercial value. It is very successfully grown within the modifying influence of the Great Lakes on our northern borders, also along the Atlantic and Pacific coasts as far north as the 40th degree of latitude, and throughout favored sections of the interior. Wherever peach culture is fully successful it is exceedingly profitable, and in many sections not strictly of this character the more hardy varieties, if not commercially valuable, may be grown as amateur fruits, well worthy of the care we bestow upon them.

The peach above all our cultivated fruits inclines to reproduce its like from seeds. I do not mean by this that seedlings may be relied upon to produce the same variety as that from which the seed was taken, but most likely offspring of marked family resemblance. This fact being generally known, gives rise to innumerable varieties, through the common habit, especially where peach culture is not fully successful, of trusting to seedlings, as they are generally admitted to be more hardy. Many of these might, on account of hardihood of trees and bearing qualities, prove of great value if they were propagated and disseminated, which, through neglect, are lost. In strictly peach regions, where market qualities are desirable, only budded varieties are grown to great extent.

Here we will find manifested commendable zeal in the origin and preservation of desirable varieties. The catalogues of peach nurseries vie with each other in presenting to their customers new and promising sorts. Along the Gulf coast, south of the parallel of really successful culture of ordinary varieties of peach, experiments are being made with a class of peaches introduced from eastern Asia, with encouraging results. From this source varietie sare being produced which seem to withstand the high per cent. of atmospheric humidity which prevails in that section. Of this class the Peen-to or Chinese flat peach seems to be most promising. An exchange says:

"In southern Florida the Peen-to grows to perfection, especially in the sandy soil of Orange, Polk, and Volusia Counties, where it matures fruit of fine quality before the fruit in Georgia or northern Florida is ripe. Dr. Berchmans says of this peach: 'The Peen-to, together with the Honey, succeed in Florida where the other varieties of the common or Persian strain prove of little or no value. It matures in Florida from April 15 to May 10.'"

THE NECTARINE (*P. vulgaris*, var. *lævis*).

This fruit, being at the most only a subspecies, or possibly only a variety or sport of the peach, having as its distinguishing characteristic a smooth skin, scarcely deserves special mention here. It only succeeds where the peach does, and even there often succumbs to the attacks of the curculio, which, owing to the absence of down on the skin, finds it an easy prey. Its cultivated varieties are not numerous, and perhaps there is little effort made to greatly increase the list.

THE ALMOND (*Amygdalus communis*).

Almond culture is indulged in to some extent in portions of California. Very closely related to the peach, a native of northern Africa and the mountains of Asia, it only succeeds where the peach may be profitably grown. There are a number of varieties, indeed, almost distinct species, of the almond in cultivation. This fruit, if we may apply the term to it under the strict rules of pomology, is only grown for its kernel, which is quite extensively used, both in its natural state and in confectionery. Quite a commercial business is done in almond culture in portions of California, where new and improved varieties are frequently met with. The peach,

nectarine, plum, and apricot grow readily when worked on the almond stock, indicating the existence of a close botanical relationship between the several species.

THE APRICOT (*Armeniaca vulgaris*).

Apricot culture in the United States is limited to a comparatively small area of territory, mainly the Pacific coast section. This is largely due to two causes: First, because of its blooming so early it is very liable in localities subject to late spring frosts to be killed thereby; and, second, being a smooth-skinned stone-fruit, it is very subject to the attack of curculio. For canning and evaporating purposes, as well as for use in the fresh state, it is a very profitable fruit in sections adapted to its culture. Here new and improved varieties are frequently produced. The apricot occupies an intermediate place between the plum and the peach, perhaps not being closely enough related, botanically, to hybridize with either, but having sufficient affinity for each to bud and graft successfully on both. It is a native of Southern Asia, and is largely grown in China and Japan, where it is said to be one of the most valuable fruits.

THE QUINCE (*Cydonia vulgaris*).

There are three distinct species of the quince in cultivation in the United States; the one (*C. vulgaris*) for its fruit, and the others, the Chinese and Japanese species, mainly for ornament;* the first from the city of Cydon, in Crete, and the others from the countries named. The quince is hardly an edible fruit in its natural state, though admirably adapted to preserving in various forms, especially in company with other fruit, to which it imparts a most delightful flavoring. Its cultivated varieties are not numerous, though it is very profitably grown in many sections of the country.

The Japanese species (*P. Japonica*) is quite generally cultivated throughout the North as an ornamental flowering shrub, while the Chinese, much less hardy, may frequently be met with in the South.

Each of these species often bear fruit of fair size, which, used for jellies, in connection with other fruits, imparts most delicate flavorings. There is no doubt but that further culture, with a view to the development of improved varieties, may result satisfactorily in case of these rather newly introduced species.

THE FIG (*Ficus carica*).

Fig culture, except in California, is not successful in the United States, without winter protection, north of the thirty-second degree of latitude. Owing to the over-moist atmosphere of the Gulf States, it is not grown there for commercial purposes, but in southern and central California it finds a congenial climate, where it is in many places already a staple crop. There is no doubt, also, but what its profitable culture will be extended in the near future over a large portion of Arizona, New Mexico, and Texas. The fig has been domesticated from the earliest history of man, and the country is most highly favored by nature where he may enjoy the fruits of his own "fig tree." We may not claim for this that it is a new fruit, but rather that in its numerous varieties it is "valuable" in regions where it may be successfully grown, as it is now in California.

THE POMEGRANATE (*Punica granatum*).

This singular fruit may not prove to be immediately valuable in any portion of the United States, though well worthy of notice here. Its range of latitude corresponds to that of the fig. It is a native of the south of Europe and Asia. The pomegranate is well worthy of a place in amateur collections, wherever climate and soils are adapted to its growth, if indeed it may not under such circumstances present claims upon the more strictly commercial fruit grower. Downing describes but three varieties of this fruit. In addition to its fruit, there are many varieties of pomegranates cultivated alone for ornamental purposes, they producing exquisitely beautiful flowers.

THE OLIVE (*Olea Europea*).

Olive culture in the south of Europe is a very profitable industry. The late Marshall P. Wilder is represented as saying, after an official sojourn in Europe, that "it

*The Chinese quince is highly prized in the South for its fruit, which sometimes attains two pounds in weight. It is not hardy in the Northern States.—VAN DEMAN.

plays a most important part in the domestic economy" of that country. One hundred years ago Thomas Jefferson heartily recommended its introduction into Virginia and other Southern States. Its culture, however, has not so far proved very profitable in the Atlantic and Gulf States. In portions of southern California it is now receiving careful attention, and bids fair to prove most satisfactory and remunerative. If, as the friends of olive culture in California predict, it should prove so successful there, then there doubtless are large areas in Arizona, New Mexico, and Texas where its culture must also become profitable. Let it be thoroughly tested in those regions.

THE BANANA (*Musa sapientum*).

If it should prove possible by special culture, with a view to the production of hardier varieties, to adapt or acclimate the banana within the territorial limits of the United States, even though it should be in small areas, it would be a triumph worthy of all reasonable effort. No fruit has so rapidly grown in esteem and popularity among the American people within the last few years as the banana. Scarcely a decade has passed since a car-load of bananas would have supplied for an indefinite time the markets of one of our largest cities. Now there are tons and tons of them used daily, and it is a poor market, indeed, where they may not be found at all seasons of the year. From being a luxury admired and used by the few, they are now sought for as daily food by millions. I know of no sacrifice too great, if it should only give the hope of success, for us as a people to make in order to adapt this magnificent fruit to culture in sections of our country. Let the effort be made.*

THE MEDLAR (*Mespilus Germanica*).

The medlar is a native of Europe, where it is frequently met with in its wild state. By some botanists it is considered as a member of the genus *Pyrus*, with which it certainly has close affinities as it is often propagated by budding or grafting on the pear. None of our American authors on fruit culture have deemed it worthy of notice, though in Germany and other central European states it is quite a popular fruit. The fruit, which is of fair size, is very peculiar in appearance and character, it having a dark-brownish skin and firm, austere flesh, and is said to be "only eatable after having been kept until the first stages of decay, called bletting, has thoroughly softened the flesh of the pulp. In this state the medlar is highly prized by some, who are fond of its rich subacid flavor." It is a handsome but small tree, which is often used for hedges in Europe. It is hardly probable that the medlar will ever become either popular or profitable in this country.

THE LOQUAT (*Eriobotrya Japonica*).

A related species to the above is now quite common in the Gulf States, where it is cultivated, probably more as an ornamental tree than for its fruit. The latter, however, may frequently be met with in the city markets as "Japan plum." The tree is a broad-leaved evergreen of handsome form and foliage, and with its flowers, which appear in large terminal spikes in autumn, followed in early spring by clusters of yellow fruit, may be seen in all ornamental grounds in Southern cities. The fruit has a very pleasant sub-acid flavor, and were it not subject to injury by frosts, blooming and maturing its fruit as it does, during the winter season, would probably become a popular fruit in the extreme south of the United States.

THE GUAVA (*Psidium*).

This is a small, pulpy fruit, used largely for jellies and preserves. There are a number of species in cultivation. It is fast becoming popular in Florida and portions of California, where, although a native of tropical America, it has become fully acclimated. Among newly introduced fruits it bids fair to take front rank in the semi-tropical sections of the United States.

THE PINE-APPLE (*Ananassa sativa*).

Like the guava, the pine-apple is a native of the West Indies and Central America. It is only grown successfully in southern Florida, where it is promising to prove of value.

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* It has been made and with good success in the more tropical parts of Florida.—H. E. VAN DEMAN.

THE COCOA-NUT (*Cocos nucifera*).

A native of the South Sea Islands, the product of a stately palm tree, succeeds only in the maritime districts of south Florida, where great anticipations are now based upon its probable future value.

THE DATE (*Phœnix dactylifera*).

Like the foregoing, the date is the fruit of a magnificent palm tree, a native of Northern Africa, where, next to the camel, it is the greatest blessing of that arid region. The date palm is hardier than the cocoa-nut, thriving as far north in the Gulf States as New Orleans and Mobile, but owing to the high per cent. of atmospheric humidity prevailing in that section is not fruitful. It is grown there only as an ornamental tree and it is greatly admired for its stately habits and symmetrical beauty. In southern California, however, where the climate more nearly resembles its native home, it is being introduced with great promise of success, as it will doubtless prove to be throughout the whole section of the United States bordering on Mexico.

THE ORANGE (*Citrus aurantium*).

We come now to notice the orange and its near relatives, the lemon, the citron, the lime, the shaddock, and the pomelo. At the head of the citrus family stands the orange. In our school-boy days, less than half a century since, the orange was only known in this country as a foreigner—an alien, scarcely thought to be susceptible of acclimation on American soil. It was seldom mentioned and less seldom seen, being only referred to as the type of beauty, and, in the school-room, for the purpose of illustrating the globular form of the earth. What few oranges then reached our shores were from the south of Europe and the adjacent portions of Asia, the land of its nativity, and were considered a luxury, only to be indulged in by the wealthy. The orange is now a staple fruit throughout the whole of Florida and a small portion of other Gulf States, and especially the vast areas of central and southern California. Varieties have rapidly multiplied and also great improvements have been made in modes and methods of culture, marketing, etc. Perhaps no lands within the limits of the United States have so rapidly enhanced in value for merely tillage purposes as lands adapted to orange culture. This evinces the wonderful progress being made in special sections, and the commercial value of this industry. With the rapid growth of the orange industry the spirit of improvement of varieties keeps pace, which varieties are now much finer than formerly. Fortunately for the producers, the crops of the two sections of our country adapted to orange culture do not come into competition in the markets, and therefore prices are always satisfactory, as the oranges of Florida are well off the market before those of California come in. Probably one of the most promising newly introduced varieties of the orange is the Washington Navel, which is rapidly taking the front rank, both in California and Florida, not only for merely commercial purposes, but also on account of its exquisitely fine quality. The Mandarin orange, a very peculiar variety almost amounting to a subspecies, together with its near relative the Tangierine, natives of Southeast Asia, are gaining some popularity, especially as amateur fruits in orange-growing districts.

THE LEMON (*Citrus limonium*).

Among citrus fruits the lemon ranks next in value to the orange. It is successfully grown only in south Florida and in southern California, it being somewhat more tender and susceptible of injury from frosts than the orange. Notwithstanding lemons are profitably grown in the regions named above, the industry has not, as yet, become sufficiently renumerative to justify very extensive planting of this fruit on land necessarily well adapted to the growth of the orange, which proves so much more valuable. Hence a large per cent. of lemons in this country are still imported from the south of Europe.

THE LIME (*Citrus limetta*).

This differs from the lemon, to which it is very nearly related, in the color of the flowers, which are white (those of the lemon being tinged with red), and in the smaller size of the fruit. It is also less hardy than the lemon and is restricted to a comparatively small area. The lime is more acid than the lemon, it being the source of most of the citric acid of commerce. It is also used largely in its green state for

pickling and preserving, for which it is esteemed very highly. Its culture, like that of the lemon, is so overshadowed by that of the more remunerative orange as to keep it somewhat in the back-ground as a commercial fruit. It may be found, however, in cultivation in its numerous varieties in some of the orange and lemon growing districts and may ultimately find a rank of value, especially through its manufactured products.

THE CITRON (*Citrus medica*).

It is grown to only a limited extent in the orange-growing districts of this country. Next to the shaddock, it is the largest-fruited member of its family. It belongs strictly to the lemon branch of the family, with a thick, fragrant rind, which is the portion of the fruit of value, as this, in a preserved state, enters largely into commerce, being used in confectioneries as well as for flavorings in the domestic economy. A pleasant and refreshing beverage is also made of the pulpy portion of the fruit, much resembling lemonade.

THE SHADDOCK (*Citrus accumana*).

The shaddock and the pomelo* are mammoth members of the orange branch of the citrus family which are but little cultivated, except for ornament. Trees are very handsome in form, foliage, and flower, and especially so when loaded with their magnificent orange-like fruit, which sometimes attains the enormous weight of 6 or 8 pounds. A rather pleasant beverage is often manufactured from the pulp of these fruits.

THE WILD ORANGE.

The wild orange, or bitter-sweet, of Florida and the Gulf coast, though not a native, has so long found a congenial home here as to be fully entitled to recognition as a "citizen." It is truly a handsome fruit, and, though deceptious in quality, may possibly prove valuable in the hands of the experimenter as the parent of future valuable varieties. Having escaped from cultivation in the early years of American history, it has, unrestrained, now had time to gain many desirable qualities, lost during captivity. It may therefore now be found in first-class condition for valuable and interesting experimentation. As it is, it is of great value as furnishing hardy stocks for the cultivated orange, in addition to its truly ornamental qualities of tree, flower, and fruit.

THE CHERRY (*Cerasus sylvestris* and *C. vulgaris*).

Downing separates the cherry into two classes—first, the Bigarreaus and Hearts, and second, the Dukes and Morellos. These amount almost or quite to distinct species. The cherry, excepting some native species not yet subjected to cultivation and improvement, is a native of Asia. It has been handed down to us with the improvements of many centuries of domestication. The Hearts and Bigarreaus, being strong and vigorous growing trees, are somewhat tender in many sections of our country, especially in the level, fertile West, and are therefore not so generally cultivated, though as a rule the fruit is of fine quality. According to Dr. Warder, the Hearts and Bigarreaus are not entirely reliable except on soils where the American chestnut is an indigenous growth, or at least successful when introduced. The Dukes and Morellos are more hardy and fruitful, this class embracing varieties like the Kentish, which are quite universally popular. Though in some sections a profitable fruit, the cherry has scarcely held its own in point of popularity along with other classes of fruits during the last quarter of a century. This is perhaps partly due to the overshadowing popularity of the strawberry and other small fruits coming into competition with it, by reason of their ripening at or near the same season. In some particulars, however, especially for culinary purposes, the cherry is not likely to be entirely superseded by any of its host of rivals. The late Dr. Kirtland, of Cleveland, Ohio, made the improvement of the cherry, which succeeds admirably in that section, the specialty of his life work. In this way he gave to the world a number of valuable varieties. More recently new introductions are being made from abroad, through the energy and perseverance of Professor Budd and others, with encouraging prospects. We may hope from this source to obtain varieties directly and indirectly which will prove more hardy and valuable, especially north of the present limit of cherry culture. As in-

*The pomelo is a fruit fast gaining a good reputation in the Northern markets, as well as in Florida.—H. E. VAN DEMAN.

timated above, very little, if any, effort has yet been put forth in the improvement of our native species, of which Professor Gray mentions at least four. The arts of horticulture, aided by the hand of time, may yet subjugate to the uses of man some or all of these now untamed species.

THE PLUM (*Prunus*).

We have purposely deferred notice of the plum and some other fruits which follow because of the advanced condition of improvements of their American congeners, which will now be taken up and described along with our observations on the genuses to which they may belong.

P. domesticus, to which species, with perhaps the exception of a few newly introduced varieties from the east of Asia, all our introduced varieties of the plum and their descendants belong, is thought to be a native of Asia and the south of Europe. Like all classes of foreign fruits, the plum has long been in process of improvement. There are sveral types or families of the plum, some quite distinct and very marked. Of these the Gages, the Damsons, and the so-called prunes are examples. They are doubtless the result of long and careful culture, with certain objects in view, viz, the production of varieties with given characteristics. There are sections of our country where the domestic plum succeeds admirably, and among all cultivated fruits none are more justly esteemed than it is. There was a period, back in the forties, when plum culture was quite successful, if not to say profitable, on American soil, but owing to the increasing prevalence of disease and especially of the curculio, which above all other fruits prefers the plum, the industry waned, until, generally speaking, it ran to a low ebb. For some years past, however, plum culture has been on the increase, not including some newly acquired territory, notably the Pacific slope, where it has ever been exceedingly successful and profitable. This is not so particularly the result of improvement in varieties as it is to unknown and natural causes, which are continually operating to change results either for better or for worse, although many new and valuable varieties have been added to our lists meanwhile. In the admirable climate of California, Oregon, and other transcontinental States and Territories, plum culture is rapidly becoming a profitable commercial industry. Many tons of cured prunes, equal to the best European brands, are annually produced on the Pacific coast.

Of Japanese varieties of recent introduction much is now claimed. Prominent among these may be mentioned the Kelsey, *Prunus pisardii*, and *P. Simonii*. It is not definitely determined whether these belong to distinct species or whether they may not be varieties of *P. domesticus*, modified and changed by cultivation in the strangely singular country of their nativity. While these varieties may, and doubtless will, succeed well in California and the South, they may be looked upon as probably tender in the cold North.

P. chicasa and P. Americana.—We come now to notice species which, with perhaps the exception of our native grapes, the last few years marks the greatest triumphs in the horticultural improvement of American fruits. To a doubting Thomas, the story of the parentage of our luscious peach, the melting pear, or the delicious plum, buried in the obscurity of centuries of history, into which traces of error may have crept, probably seemed to border upon the fabulous; but we are now dealing with fruits which, less than four hundred years since, were entirely unknown and unthought of by civilized man. But for man's interference we may fairly assume that the *chicasa* plum of America would to-day exist only in its true type, in which would be recognized scarcely more of variety than is visible in a flock of wild blackbirds. The arts of horticulture have already trained these wild species to sport into innumerable varieties; in time of ripening, early, late, and medium; in quality, good, bad, and indifferent; in habits of growth, tender, hardy, iron-clad, vigorous, and fruitful; in color, with almost the tints of the rainbow. Among these are many varieties which combine all the qualities of excellence and value, excepting, perhaps, mere quality of fruit, of the best varieties of *P. domesticus* and far surpassing it in point of hardihood and productiveness. The improved offspring of these two American species, mainly of the *chicasa*, may now be found in cultivation from the Gulf of Mexico on the south to Lakes Superior and Winnipeg on the north, and from ocean to ocean. It would be valueless, in this connection, to attempt to catalogue or describe the almost legion of native plums in cultivation or on trial, and many of them thoroughly established, in our country. Our rapid strides in the improvement of this fruit should greatly encourage us in efforts to domesticate other American species as yet neglected. By cross-breeding and hybridization, the latter of which is altogether possible, combinations of qualities may result which alone would prove immensely valuable to the cause of pomology.

THE GRAPE (*Vitis*).

The grape is a justly popular fruit. There are a number of distinct species under cultivation, though prior to the discovery of America there seems to have been but one, *V. vinifera*. The grape of the Eastern Hemisphere is thought to have been a native of Persia, though its early history, being almost coeval with that of man, is somewhat obscured in doubt. Ancient, medieval, and modern history, sacred as well as profane, abound in just praises of this luscious fruit. Having thus been the companion of man from an early period, the grape of the Old World may be considered one of the most thoroughly domesticated of fruits. Originating as it did near the place of man's nativity, it has followed up his civilization, marking every age of his history with its presence and its civilizing influences. This is specially true so long as civilized man was confined to the Old World. When he crossed the Atlantic, where he found a congenial home, he soon discovered that his favorite vine failed to yield its luscious treasures. Repeated efforts, based upon the highest skill known to the arts of horticulture, only resulted in failure, so far as its culture in the open air was concerned. Despair finally seized upon him and a dark and hopeless age in which grape culture upon American soil was seemingly abandoned and unknown comes about. William Coxe, in the first American work on fruits, published in 1817, does not so much as notice the grape, while Stephen Switzer's work, published almost a century earlier, in London, describes a number of varieties then highly esteemed in England. In 1845, the late A. J. Downing describes thirty-five varieties of foreign grapes as adapted to and worthy of culture under glass, while of native varieties he only mentions twelve, "which," as he says, "are accidentally improved varieties that have sprung up in the woods and fields from wild vines." These discouragements, due mainly to unfavorable climatic conditions, prevailed, with few exceptions, until the "Star of Empire" sat upon the Pacific coast, the paradise of American pomology, where the *V. vinifera* found a new and congenial home. Here the grapes of the Old World all thrive. Within the last quarter of a century grape-growing in California has almost revolutionized the grape commerce of the world, so far as the manufactured products, wine, raisins, etc., are concerned, and yet the industry seems only to have passed the stage of infancy. All the varieties of the *vinifera* species known to the south of Europe, and many of their offspring, having their origin here, flourish in the genial climate of the Pacific coast region of the United States.

Prof. George Husmann, of Napa, in a paper on the "Past, Present, and Future of Grape Growing in California," published in volume 4 of the Transactions of the American Horticultural Society, has the following comments on the progress of the grape industry in that State:

"When gold was discovered in California, during the exciting times of its early settlement, by those who flocked by thousands and tens of thousands over the plains and across the ocean to seek the glittering treasure among its hills and along its streams, but few had an idea that this land, with its rainless summers, would, in the short space of time which has since elapsed, become more famous for its golden fruit and wine than it could ever be by the glittering metal found in the depths of the earth; that its hills and plains, looking so dry and barren during the summer months, would sustain smiling vineyards and trees laden with fruit. It was generally supposed that vines and trees could only live and thrive with irrigation; that the Mission grape, first cultivated by the Jesuit fathers, which even then found its way into the mines and was readily purchased by the delvers after gold, could only reach its luscious ripeness by being freely supplied with water during the dry months. From this small beginning, at one location and one variety, what a change! Grape-growing has spread over the whole State, until its wine crop—only one of the uses to which the grape is devoted—is estimated at about 20,000,000 gallons this year. From one variety cultivated then, we have close to four hundred varieties now, and we already produce as fine wines as any country on the globe. From the few scattering small vineyards then in the State, which were irrigated several times a year, our vineyards now look down on the land from the highest tops of the mountains, and there produce their choicest fruits, without irrigation, being more secure from frost and other deleterious influences there than in the valleys. Their smiling verdure greets the eye, and is readily distinguished thousands of feet above the valleys. Our raisins are already competing with the finest London layers in the markets of the world, and our table grapes are shipped to every city and town in the Union."

As indicated above, several native species have contributed to our list of cultivated American grapes. These were found growing indigenously in different sections of the country, and were variously known as fox grape, frost grape, summer grape, winter grape, muscadine, etc., in their several localities. Leading character-

istics of these wild species were luxuriance of growth and rambling, unrestrained habits of vine, often mounting to the tops of the tallest forest trees and loading them down with their weight of foliage and fruit, which, however, was of inferior quality. We have said that there are several native species of the grape found within the limits of the United States. Prof. Asa Gray recognizes only four species (*V. labrusca, V. æstivalis, V. cordifolia*, and *V. vulpina*); the late Dr. Englemann enumerates thirteen (*V. labrusca, V. candicans, V. Carribœa, V. Californica, V. Monticola, V. Arizonica, V. æstivalis, V. cinerea, V. cordifolia, V. palmata, V. riparia, V. rupestris*, and *V. rotundifolia* or *vulpina*); while Prof. T. V. Munson, an eminently practical horticulturist as well as a scientific botanist, classifies them into more than twenty distinct species. This includes a number of new species recently discovered. It would seem from these differences that botany is as yet not a mathematically true science. Professor Munson admits, however, that "all botanists who have attempted the classification of the grape genus have complained of its difficulties and confusions of one form with another. Many have concluded that its so-called species are only artificial terms to indicate certain forms of considerable extent, but that in reality there is no clear separatrix." But these scientific questions have little to do with the matter in hand. It is sufficient for us to note the most wonderful developments which have been made in the improvement of American grapes within the few years intervening since the publication of Downing's original volume in 1845. At that date only twelve varieties were named, none of which are now generally cultivated (the Catawba and Norton's Virginia only having local values at this time), aside from the Scuppernong, which is strictly a Southern variety. To this list has since been added hundreds if not thousands of new varieties, many of which rival the very best foreign sorts in point of quality, with constitutional vigor and hardihood to resist the vicissitudes of our peculiar climate and our diversified soils.

There is certainly no class of cultivated fruits to which the "science of breeding" has been so successfully applied, and in which more rapid developments have been manifested, than in connection with the improvements of American grapes. The elder Downing spoke the truth when he, only forty years ago, said of American grapes that they (the then improved varieties) "have sprung up in the woods and fields from wild vines," and that "they are therefore but one remove from a wild state." He further mentions "extensive trials which are now being made by various cultivators to produce new varieties from these," closing with the prophecy, already fulfilled, that "there is little doubt that in a few years we shall have many new native sorts, combining the good qualities of the best foreign grapes with the hardiness of the indigenous ones and with also the necessary adaptation to the various soils and climates of the United States."

In the hands of such men as Underhill, Grant, Rogers, Ricketts, Moore, Caywood, Campbell, Munson, and a host of others, aided by the light of science and practical skill, there is no longer a necessity of our waiting uncertain results of "accidentally improved varieties," which shall spring "up in woods and fields from wild vines." Now (thanks to these painstaking, intelligent men), every American citizen worthy to be recognized as such may almost without effort on his part enjoy the luscious fruit of "his own vine" in some of its numerous species and varieties. There can be found in all the range of human experience and observation no more convincing evidence of the triumphs of horticultural arts than are plainly manifested in the recent and marvelously rapid progress which has been made in the complete domestication and wonderful improvements in the wild American species of the grape. Many of these are artificial hybrids and cross-breeds, combining the good qualities of one or more species of American grapes and including *V. vinifera*, which always adds qualities of excellence, although it is generally at the expense of constitutional vigor.

SMALL FRUITS.

We come now to speak of a class of fruits the popularity and importance of which are fast being recognized. Indeed, as the staple orchard fruits have, in large sections, declined, small fruits have taken their places. It is a fact which we can not ignore that the apple, especially the staple fruit of former years, is rapidly becoming unreliable, and while no other fruit is, or can ever be, an entirely satisfactory substitute for it, small fruits must to a large extent be accepted as such from sheer necessity. These causes, together with the increasing demand for such fruits in the markets, and the facility with which they are now preserved, by canning, etc., has so stimulated small-fruit culture as to have taken it from the garden and fully established it in the field, expanding the industry from being the work of the amateur

to the professional and the commercial grower, where the market statistics of the present fully entitles it to rank. This rapid expansion of the small-fruit industry has stimulated a corresponding improvement in varieties which were formerly few and inferior as compared with the present.

THE STRAWBERRY (*Fragaria*).

Among small fruits none are so universally popular and valuable as the strawberry, which, according to Downing, "is a native of the temperate latitudes of both hemispheres—of Europe, Asia, North and South America—though the species found in different parts of the world are of distinct habits and have each given rise, through cultivation, to different classes of fruit." At the time this paragraph was penned, in 1845, strawberry culture was in its earliest stages of development in America. Downing then only described thirty-six varieties, most of which were of foreign origin and belonging largely to foreign species. Our native species (*F. Virginiana*) was then found in the meadows and fields, where they became the object of much solicitation to children who brought them to market in small quantities and in even smaller sizes from their native fields where they grew uncared for and neglected of men. This then neglected species and its hybrids and cross-breeds are now the leading varieties in cultivation. There are probably no varieties of either of the three European species (*F. vesca*, *F. Colina*, and *F. elatior*), pure and unadulterated, without mixtures and crosses of one or more of the American species (*F. Virginiana* or *F. Chilliœnsis*) now in general cultivation. America may therefore be claimed as the home of the strawberry so far as valuable varieties are concerned, as it is in reality the present paradise of the industry.

The strawberry may be truthfully considered the only universal fruit of the United States, there being no section of our whole country, in any degree adapted to cultivation, where it may not be successfully and profitably grown. In the extreme South and in California, where their winters are mild and spring-like, the season of ripening is greatly prolonged, covering months of time, while to the northward the crops ripen more uniformly. These facts, together with the present facilities for distributing the crops through the aid of the railroads (the great equalizers of the age), the leading markets of all sections are supplied with this luscious and exceedingly healthy fruit for long periods. We have already referred to the rapidly increasing magnitude of the banana trade and to the great and growing grape industry, but each and all other interests of a similar character are fairly eclipsed by the still more rapid growth of the strawberry business during the last quarter of a century. As an illustration of what this business now is, the following is quoted from the address of Hon. Parker Earle, president of the American Horticultural Society, read before that organization at its late meeting in the city of Cleveland, Ohio, September, 1886:

"Thirty years ago the daily receipts of strawberries in the city of Chicago—now the second greatest fruit market in the world—could have been carried in one wagon at one load, and it would not have been a large load either. Now whole railway trains are engaged to carry the daily supply of that market, which often amounts to 300 tons, and sometimes to twice that quantity. A similar increase of supply has taken place in most of the markets of the country. The production of the Wilson strawberry was the beginning of a new era in strawberry culture, and I may add of small-fruit gardening; for all branches of the business have been stimulated and carried along by the tide of enthusiasm which has planted strawberry fields all over the continent, and covered the tables of the rich and of the poor alike with their dishes of fragrance and crimson beauty. Thirty or forty years ago it would be safe to say that all the strawberries marketed in one day in the United States could have been gathered by a force no larger than I have seen bending over the smiling rows of a single plantation. Now there are probably not less than a quarter of a million harvesters engaged in gathering this delightful fruit for market-growers. Then the season of this fruit was limited to the three or four weeks of its ripening in each locality; now, by the help of railways and refrigerator transportation, it extends over four or five months of the spring and summer, and strawberries are sometimes transported a distance equal to that from the Atlantic to the Pacific seas."

New varieties.—Of course the rapidly increasing interest in strawberry culture has resulted in the origin and dissemination of innumerable new varieties, some accidental seedlings, and others the result of careful and painstaking breeding. Generally speaking, the tendency has been towards improvement, though, of course, a large per cent. of these seedlings have proved, on trial, to be no better, if so good, as the older sorts. With the large commercial interest which the strawberry business now represents, every new-comer which bids fair to be an improvement is hailed with delight, and its praises are heralded with the flourish of trumpets by

interested parties, who, with "wind as a motor" and "cash as the objective," stand in readiness to supply the novice with plants which are to eclipse all known varieties in point of size, quality, productiveness, etc. Thousands and tens of thousands of dollars are annually expended in this way by men who, having but little practical knowledge and less skill in the business, must necessarily reap disappointment.

The origin of the Wilson, about the year 1856, near the city of Albany, N. Y., marks, as Mr. Earle has well said, "a new era in strawberry culture." Indeed, its culture has been more generally successful than any variety originated since and thoroughly tested. Its rapid introduction and almost universal success greatly stimulated strawberry-growing, especially as a commercial industry, and with it the desire upon the part of progressive growers to produce something better; for, as Pardee has said, "this fruit is so soon and so easily raised from seed that the process invites to a very attractive series of experiments." To such as have the time, means, and inclination thus to experiment, there can be no more delightful and interesting field of operation, which also promises liberal remuneration for those who are successful in the production of varieties of true worth; but the valuable advice of Mr. J. M. Smith, president of the Wisconsin Horticultural Society, to the novice of limited experience and especially of limited means should not go unheeded. He says:

"Don't be in a hurry to get these new varieties that come out and are being recommended by this man or that; wait till good reliable growers in your vicinity, or some men that you know are reliable, have tried them. You can grow varieties that will answer your purpose from those kinds now in use. If you have plenty of time and plenty of money, and like to experiment with new varieties that come along, you will find plenty of use for your time and money, and, by the way, get very little return for either."

As has frequently been intimated in this paper, the author can not safely enumerate a list of new varieties here, which are now regarded as promising, through fear of misleading the planter, since there are so many local influences which naturally affect results in strawberry growing. To the professional grower, and especially to the State or nation, truly belongs the duties of the experimenter; but to the average planter we most heartily commend the good advice of President Smith, than whom there is no safer and more thoroughly practical and successful guide in matters pertaining to the culture of the strawberry.

The Raspberry (*Rubus*).

Next to the strawberry, the raspberry is probably the most valuable of the small fruits. It belongs to the same botanical genus (*Rubus*) as the blackberry. There are three species, one foreign and two native, from which our cultivated varieties are derived.

R. Idæus is a native of the mountainous districts of the south of Europe. It has long been domesticated, and, as with all Old World fruits, is much more highly developed than are the American varieties. The class of berries known as Antwerps and all their American descendants belong to this species. The size and quality of varieties belonging to this species are superior to any yet derived from our native species, but, like foreign grapes, they are not generally free from disease and other constitutional defects, and especially are they tender and subject to winter-killing in our climate and soil. In a few favored sections, notably the Hudson River region, they succeed fairly and are very justly popular, especially with amateur growers, in consideration of their fine size and excellent qualities of fruit. As with grape culture, the first efforts at raspberry culture in America were with varieties of this species, which, from causes above hinted at, were not satisfactory in results. Of fourteen varieties described by Downing in 1845, all but three were foreign sorts. The great preponderance of varieties of this species at that time in cultivation shows how great the effort to overcome climatic conditions by persistently adhering to varieties of our ancestors. The relationship between this and one of our American species (*R. strigosus*), is so close, as indicated by the habits of plant and fruit, that they readily hybridize, and thus the good qualities of the two are often blended, so that it is possible that many of our red varieties now in cultivation are the offspring of both foreign and native parents. All strictly foreign varieties, except in favored localities, must have winter protection to succeed satisfactorily in our country.

R. strigosus.—Downing's original work describes this as a variety—the American Red—and says: "It ripens nearly a week earlier than the Antwerps, bears well, and though inferior in flavor and size to these sorts, is esteemed by many persons, particularly for flavoring liquors." The writer of this could scarcely have believed that in less than forty years this almost despised species should have given us offsprings

of such value as the Turner, Brandywine, Herstine, and numerous others which now find their way to our market centers in astonishing quantities, not to be degraded by fermentation or distillation into vile liquors, but to feed the hungry and gladden the lives of the denizens of large cities. This and the foregoing species propagate themselves by underground suckers and not by the tips, as does the following:

R. occidentalis, which is a native species. Downing describes two varieties of this species in 1845—the American Black-cap and the Ohio Everbearing. Of the former he scarcely speaks more complimentary than of the American Red, saying: "This raspberry, common in almost every field, with long, rambling, purple shoots and flattened, small black berries, is everywhere known." Think of this as the parent of our Doolittle, Gregg, Hopkins, Nemaha, Schaffer, etc. Think of the tons and tons of these and numerous other offsprings of this almost despised native species that are now grown, making fortunes for their propagators and health and happiness for the denizens of our great centers of population. And how are we to predict the future of an industry so young and yet of such vast proportions? Surely cultivation has wrought wonders upon this native species in so short a time.

The Blackberry.

As above noted, this fruit belongs to the same botanical genus (*Rubus*) as the raspberry, but differing essentially from the latter in the character of its fruit, which, according to Gray, does not separate "from the juicy, prolonged receptacle." There are two species, *R. villosus* and *R. Canadensis*, both purely native, from which our cultivated varieties are derived.

R. villosus, the common high or upright blackberry, is a native throughout a large portion of the United States. Its fruit, while in a state of nature, was probably more highly developed than that of the raspberry, though it has been greatly improved by cultivation. In certain sections of the country, especially in neglected and abandoned fields, where the blackberry delights to grow, quite a business is carried on by pickers, who gather the fruit for sale. Vast quantities of this wild fruit finds its way into the markets, thus supplying at once a source of income to many poor people and cheap health-giving food to consumers. While this wild fruit is vastly inferior to the cultivated varieties, it serves, as above indicated, valuable purposes in the domestic economy, especially of the poor, while materially affecting the prices of the better qualities of fruit coming into competition. It is only of very recent years that any systematic efforts at improving this fruit has been attempted, but in this short time very marked progess has been made. Downing's original work does not describe any varieties of the blackberry, only mentioning the two species as they then existed, while in his more recent revision he describes twenty-five distinct sorts, and many more have since appeared. Some of these are so manifestly better than were the wild varieties as to already have won for themselves places of front rank, in point of commercial value, among cultivated fruits. The writer has in mind a crop of the past season in which a single picker gathered forty-two gallons in one day, so abundant was the fruit. This was of one of the present leading varieties, the plants having been thoroughly cultivated, and the fruit going to market in such shape as to bring remunerative returns for the painstaking intelligence bestowed in the selection of the variety and the culture following. With the native plum, grape, strawberry, raspberry, and other fruits our success in improving the native blackberry should encourage us to look more hopefully upon our prospects of greater achievements with various American species not yet subjected to the ameliorating influences of horticultural arts.

R. Canadensis, the low or trailing blackberry—the dewberry—like the foregoing, is a native. It is not so frequently met with as the blackberry, being confined in its native habitat more strictly to hill regions. The fruit differs but slightly from the latter. There are a number of cultivated varieties of this fruit now grown, some of which exhibit qualities of merit. Among such the Lucretia probably stands in the front rank as a promising sort.

The Currant (*Ribes rubrum*).

The currant is a small fruit of some importance. Our cultivated varieties belong to the above species and are native of the north of Europe. It succeeds best in a rather humid soil and atmosphere. Like its near relative, the gooseberry, it is a very popular fruit in Great Britain and the north of Europe, where the climate is well adapted to its culture. Several imported insects (the currant caterpillar and the borer) have of late years seriously affected the culture of the currant in most sections of the country, though scarcely any American garden is thought to be com-

plete without its supply, for domestic uses at least. These usually occupy some obscure corner in the garden, where they, if not too seriously injured by insects and the like, produce satisfactory crops, and are a favorite in the kitchen for pies, jellies, etc. Downing says, in speaking of the currant in its wild state in Northern Europe: "The fruit of the original species is small and very sour, but the large garden sorts produced by cultivation and for which we are chiefly indebted to the Dutch gardeners, are large and of more agreeable subacid flavor." From the scientific name of this species (*Rubrum*), we should infer that the original currant was of a reddish color; but numerous varieties introduced by cultivation are light-colored, if not white. The white varieties, as a rule (if not invariably), are less acid than the colored sorts, which, indeed, seems to be true of all albinos among small fruits of whatever species. There are a number of native species of the currant, but none have yet been generally domesticated, at least have not become sufficiently improved to entitle them to prominent rank among cultivated fruits.

The Gooseberry.

Like its near relative, the currant, the species (*Ribes glossularia*) is a native in the north of Europe, where, and also especially in England, it has long been a very popular fruit, having reached a high state of improvement. Our climate does not suit it so well as that of England, as, like some other foreign species, it is not entirely healthy here, it being subject to mildew and disease. There are a number of American species, but until within comparatively recent years all efforts at the culture of this fruit in the United States have been with the foreign improved sorts, which have generally proved a source of disappointment. Downing, in 1845, in speaking of the gooseberry as a foreign fruit, says, "Our native species has never been improved by garden culture." Since that date, however, its improvement has been taken up, somewhat as was that of the native grape, plum, raspberry, etc., as a matter of self defense against total failure, and wonderful and most satisfactory results have followed.

R. hirtellum, the native species from which our valuable varieties, like Houghton, Downing, etc., are derived, is found growing indigenously in the northern sections of the United States. Its improved varieties (though not recognized in 1845) have already fairly eclipsed all purely foreign sorts, except in the hands of a few amateurs in favored sections, and were it not for the depredations of the currant caterpillar, which is a serious pest to this fruit as well as the currant, the culture of the gooseberry would prove exceedingly profitable. Improved varieties are already numerous and of quality scarcely inferior to foreign sorts, but as yet not cultivated up to the enormous size of some of their European relatives. They are, however, immensely productive, and for culinary purposes as a pleasant acid fruit stand second only to the cranberry.

The Cranberry (*Vaccinium macrocarpum*).

This species of the cranberry is a purely native one and to it belongs all the really valuable varieties in cultivation in this country. Prior to about 1840 no attention was given to the culture of the cranberry in the United States, the native wild fruit from the peaty bogs on our northern borders supplying all market demands. The first efforts at improving and cultivating the cranberry were made on Cape Cod, where the industry has grown to immense proportions. Andrew S. Fuller, in his "Small Fruit Culturist," published in 1867, in speaking of the growth of cranberry culture in portions of Massachusetts, Connecticut, and New Jersey, says: "Not only have individuals turned their attention to it, but companies have been formed with abundant means to cultivate the cranberry upon an extensive scale." P. M. Augur, of Connecticut, says the cranberry "occupies a niche by itself, crowding out no other fruit;" that is to say, it "thrives best where no other fruit will grow." Its native habitat is in the swamps and bogs of the northern section of the United States, and it can only be successfully grown where the ground may be artificially flooded with fresh water at certain seasons of the year—at the blooming season, to protect the blooms from injury by spring frosts and for the winter protection of the plants. Where such lands can be had, with an abundant supply of water under perfect control, to be turned on or off as need be, from 50 to 200 bushels per acre may be produced with great certainty, which sell readily for remunerative prices. J. S. Stickney, of Wisconsin, estimates the annual value of the cranberry crop of that State at from $300,000 to $500,000. Since the attention of the fruit-grower has been turned toward the culture of this fruit, numerous improved varieties have been brought into notice. Downing says "the value of the common

cranberry for tarts, preserves, and other culinary uses is well known." The cranberry is the last of the small fruits to ripen, thus prolonging the season of this class of fruits in a fresh state to midwinter or even later, and as it may be grown, as above indicated, on land wholly unfit for the production of other garden crops it may be fairly entitled to our favorable consideration and esteem.

THE HUCKLEBERRY (*V. corymbosum*).

The huckleberries, purely native species, belong, as above indicated, to the same botanical genus as do the cranberries. There are many species of this fruit found, both in the swamp and hill regions, along our northern borders. Perhaps the best of these is that under consideration. According to Fuller, as late as 1867 very little had been done by way of improving the huckleberry. He says: "Time and again have I endeavored to direct the attention of small-fruit culturists to the long-neglected huckleberry, but with no apparent good results;" adding further, "why this neglect I am at a loss to understand, for the huckleberry possesses naturally better qualities than even the currant or gooseberry." Notwithstanding this criticism, coupled with the high indorsement of the naturally good qualities of the species, I am not aware that any great progress has since been made in the way of domesticating and improving the huckleberry. Having noted the wonderful progress already made by way of improving many of our native fruits, we are still at a loss to know, as Mr. Fuller has well said, "why this neglect" of a species so promising and really so valuable in its native state, for the wild huckleberry is a source of great commercial value wherever it naturally grows. That the huckleberry is destined to become a domestic fruit of no inconsiderable value I have no doubt, but it may take time and patient skill to produce the necessary improvements, to adapt it to profitable garden culture. It is said that "the baboons of Africa are fond of fire, and they are said to gather and sit around an abandoned camp fire till the last ember is out, but they haven't quite sense enough to poke the brands together to keep the fire alive." Shall we, with like lack of foresight, permit this valuable native species to longer exist without applying to it the persuasive arts of horticulture?

THE BARBERRY (*Berberis vulgaris*).

There is probably little to be expected by way of improvement that may be made in this fruit, which, according to Downing, is indigenous to the north temperate zone of both hemispheres. He, however, devotes a short chapter to its consideration, saying while it is "too acid to eat, it makes an agreeable preserve and jelly, and an ornamental pickle for garnishing some dishes." Fuller gives it more attention, describing a number of varieties and claiming for the species great susceptibility of improvement, and thinks it "might, if a proper amount of care were bestowed upon it, become a fruit of much importance."

THE JUNE-BERRY (*Amalanchier Canadensis*)..

Dr. Gray says this native species "varies exceedingly." It ranges in its various subspecies from a low shrub not larger than the currant bush to an arboreous form. It is strange that this native fruit, which is strictly pomaceous, being closely allied to the genus *Pyrus*, has neither received notice by Fuller, Downing, nor any other American author. The large species is a really handsome tree, well worthy of a place as an ornamental if not as a fruit-bearing species. The fruit, which is small and berry-like, is of a purplish red color, ripening in June, hence the common name of June-berry by which it is frequently known. It has a pleasant acid flavor, and is especially attractive to children and birds. I am not aware that any attempt has been made to improve by cultivation the tree-like form of the species, but in case of the dwarf forms some advance has been made by way of subjecting them to garden culture and with quite satisfactory results. There is really much in this fruit to encourage the experimenter in the work of domesticating and improving the species.

THE BUFFALO BERRY (*Shepherdia argentea*).

Fuller, in his Treatise on Small Fruits, has considered the *Shepherdia* worthy of a somewhat lengthy notice. He says: "It is seldom seen in cultivation, but it is really deserving of a place in every garden." It is a native shrub or small tree found growing wild in Dakota and in the headwaters of the Missouri River. It is doubtless extremely hardy and if sufficiently fruitful, as Fuller indicates it to be,

with other good qualities which he ascribes to it, it is a matter of surprise that it has not been more extensively cultivated. The plant itself is quite ornamental, and it certainly deserves further trial, especially in the cold Northwest.

The Black Haw (*Viburnum prunifolium*).

Here is a hardy native species of pleasant, edible fruit which remains wholly neglected, so far as any effort as to its culture and improvement is concerned. It is the berry-like fruit of a small tree or shrub found growing wild in thickets of the northern section of the United States, from New England to Kansas, and is highly prized by boys (who are always good judges) and numerous wild animals, and especially birds. What its future value may prove to be in the hands of the skillful horticulturist remains for coming generations to decide. That other fruits of scarcely more natural promise have been greatly improved and rendered valuable history attests.

The Tree Cranberry (*Viburnum opulus*).

Notwithstanding the common name of this fruit, it is in no way related to the true cranberries, but is a member of the same botanical family as the preceding species. Its common name is due to the fact of its slight resemblance in fruit, both in its exterior appearance and to its sprightly acid flavor, and for which it is sometimes used as a substitute in the kitchen. It has also been well used and for many years, by enterprising nursery agents, as "bait for gudgeons," who are made to believe that they may raise their own cranberries on land certainly not adapted to the culture of the true cranberry. In this way the species has been pretty largely disseminated, but in the hands of men who were not likely to bring out its good qualities, if it should (which is quite probable) possess any such. It is a native shrub found growing wild in the Alleghany Mountains. The well-known snowball is a very close European relative of this species, and has long been cultivated for its conspicuous flowers, which has thus become entirely sterile. Whether the tree cranberry (?) shall prove worthy of this notice or not, the above remarks may serve to place it in its true light and to guard the innocent and otherwise uninformed against imposition through misrepresentation.

The Elderberry (*Sambucus Canadensis*).

My early recollections are associated with elderberry pies and jellies, prepared from the fruits which we children gathered along the fence rows in neglected fields. The quality was greatly heightened, as our good mother assured us, by an admixture of the sprightly acid juice of the wild grapes which we industriously sought for the purpose. Of more recent years, when cultivated fruits were scarce, we have found in this neglected species a valuable source of table comforts and health-giving luxury. The elderberry is also often used as a source of manufacture of domestic wines, which are supposed to possess valuable medicinal properties. The fruit of different plants are known to differ widely in a state of nature, some being very much more fruitful as well as superior in size and quality to that of others. This fact should encourage the horticulturist in the selection and culture of this fruit, which, everywhere in neglected corners and hedge rows, persistently pushes its claims to our notice. It is also a great source of food supply to a large number of our feathered friends, which alone should entitle it to our consideration. Let the elderberry be considered as entitled to a place in our list of small fruits, if we do here place it almost at the bottom of our list.

The Mulberry (*Morus*).

Downing honors the mulberry with a brief notice, describing at least three varieties, all perhaps belonging, directly or by hybridization, to the Adriatic species (*M. nigra*), which he represents as a fine fruit, but generally too tender for our climate. He describes the tree as small, seldom attaining a "height of more than 12 or 15 feet." Of recent years a class of mulberries, probably of a different species, have been introduced from Russia, concerning which much has been said by way of praise, both as a fruit-bearing tree of great hardihood as well as a forest tree, having specially desirable qualities for retimbering the plains of the Northwest. It may probably be well to take some of these representations with a few grains of allowance, as they are likely to prove to be exaggerations.

M. rubra is a native species, which Downing says is "more or less common in our woods; the fruit is about an inch long, and very pleasant and palatable though much inferior to the Black English. It bears transplanting well, or is easily raised from the seed, and may undoubtedly be improved by repeated reproductions in this way." The native mulberry is quite common in "rich woods from New England to Kansas," forming a handsome, fair-sized forest tree, the wood of which is exceedingly durable for posts, cross-ties, etc. The fruit differs very greatly on different trees, showing a natural disposition to sport into varieties, which is of itself encouraging to the experimenter. The mulberry is certainly worthy of notice in a paper like this, both on account of its present as well as its prospective value.

THE PAPAW (*Asimina triloba*).

It is indeed strange that no American author on fruit culture has considered the papaw worthy of notice. While it is true that few persons naturally like the papaw with its peculiar flavor, it is equally true that but few fail to acquire a taste for it by repeated efforts. It is a native throughout large sections of the United States, as Dr. Gray says, from "western New York, Pennsylvania to Illinois, and southward." In its native habitat it has many admirers, especially among the boys, who are sure to hold the whereabouts of the best varieties in sacred remembrance. A papaw grove is a sure index of the good qualities of the soil, which has led the farmers to destroy many of the best of these for the purpose of getting the land ready for cultivation in other and better-paying crops. This process of destruction has been carried to an extent which already threatens the extermination of the species, unless it is soon taken up by the horticulturist—which it certainly deserves to be—and adopted into our gardens. The American Cyclopedia, which is about the only authority which I can find, outside of botanical text-books, which stops to notice this fruit, well says, in speaking of its worth, that "some trees produce in the wild state fruit of superior size and excellence, and doubtless it could be greatly improved by selection and cultivation." The writer fully concurs in this opinion, and he trusts that this neglect of so promising a native species may not long continue.

THE PERSIMMON (*Diospyros Virginiana*).

Here is another native species of even greater promise than the papaw, which has been almost entirely neglected. The persimmon is found wild in a number of the older States of the Union, from Florida to Arkansas, and northward to the fortieth degree of latitude. In large sections of this vast territory it constitutes a considerable part of the living of the poorer classes, besides being enjoyed by the well-to-do in life; while animals and birds, domestic and wild, of almost all descriptions hail the ripening of the persimmon with evident satisfaction. It grows along the fence rows, in neglected corners, and in abandoned and worn-out fields, and with the persistence of the native blackberry forces itself upon us, and with its luscious products everywhere claims our attention. It further encourages us by its disposition to sport into varieties, some of which greatly excel others in good qualities. Perhaps no native fruit of the equal of the persimmon in good and promising qualities has been so neglected. American horticulturists must not longer pass by this valuable species.

THE JAPANESE PERSIMMON (*D. kaki*).

To further warrant us in the undertaking, we have of recent years received from Japan the Asiatic relative of our persimmon, which, by that painstaking people, has already reached a high state of development. There are a number of varieties of Japan persimmon, which is a truly magnificent fruit, already in bearing in California and the Gulf States, where it flourishes, and where it bids fair soon to become both popular and valuable. This fruit is so thoroughly domesticated and so highly bred, having received centuries of careful culture, as may be shown by its immense size, fine qualities, and in some varieties the entire elimination of all seeds, and is so closely related to our native species as to readily hybridize with it, which is satisfactory proof of the probable susceptibility of the latter of similar improvement. It is claimed that valuable hybrids are already in existence, which adds to the hope of thus securing varieties of sufficient hardihood to render their culture possible much farther north than the present limit of culture of the Japan species.

CONCLUDING REMARKS.

We have now hastily noticed each of the fruits, native and introduced, which are grown to any great extent in the United States. In the preparation of this paper I have been wonderfully impressed with the growing importance of our native species of fruits. Many of these are peculiarly American, while others have their foreign relatives, which have been introduced from abroad. Among the latter may be mentioned the plum, grape, strawberry, raspberry, gooseberry, cranberry, mulberry, huckleberry, and the persimmon. While the native species have, perhaps, in no instance reached the degree of excellence of fruit to which their foreign relatives have attained through the long years of careful training which they have been subjected to, it is nevertheless true that in point of hardihood and constitutional vigor of fruit and plant that they compare favorably, if, in reality, they do not generally excel. The blackberry, huckleberry, service, and papaw are distinctively American species, and although some of these have not been domesticated, our success in improving our native fruits should prompt us to keep in mind the work so well begun, and which has given us such satisfactory results.